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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/530,870	01/13/2006	Marc Uwe Tornow	052275	2261

38834 7590 04/30/2008

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EXAMINER

GOODWIN, DAVID J

ART UNIT

PAPER NUMBER

2818

MAIL DATE

DELIVERY MODE

04/30/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/530,870

Applicant(s)

TORNOW ET AL.

Examiner

DAVID GOODWIN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 1-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. The language of claim 7 is unclear as it is missing article adjectives and contains an extraneous "and."

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 through 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krahne ("FABRICATION OF NANOSCALE GAPS IN INTEGRATED CIRCUITS" APPLIED PHYSICS LETTERS, AMERICAN INSTITUTE OF PHYSICS. NEW YORK, US, vol. 81, no. 4, 22 July 2002 (2002-07-22), pages 730-732, XP001130351) in view of Lieber (US 7,129,554).
3. Regarding claim 1.
4. Krahne teaches a method of making a semiconductor device. Said device comprises a patterned semiconductor hetero structure forming a source drain and gate

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contacts to build up a hybrid device from the semiconductor base structure (fig 1e). The device further comprises a wire connecting the source and drain electrodes. Said devices comprises single electron transistors (fig 1f).

5. Krahne does not teach that the wire is organic.
6. Lieber teaches a semiconductor device comprising a single electron transistor (fig 16a, b) (column 21 lines 35-65). Said device comprises a nanowire, said nanowire comprises a carbon nanotube (column 4 lines 55-65, column 9 lines 25-40).
7. It would have been obvious to one of ordinary skill in the art to make the channel of the single electron transistor out of a carbon nanotube nanowire because nanowires are ideally suited for the transport of charge carriers (column 1 lines 30-35).
8. Regarding claim 2.
9. Lieber teaches that said nanowire is a carbon nanotube (column 4 lines 55-65).
10. Regarding claim 3.
11. Lieber teaches that said device comprises a sensor (fig 16c) (column 22 lines 5-15).
12. Lieber teaches that said sensor comprises functionalising the nanowire (column 18 lines 40-60).
13. It would have been obvious to one of ordinary skill in the art to functionalize the nanotube so that a specific moiety can be sensed.
14. Regarding claim 4.
15. Lieber teaches that the sensor has receptors that sense proteins or antibodies. (column 6 lines 1-15).

16. It would have been obvious to one of ordinary skill in the art to have receptors that sense antibodies or proteins because antibodies and proteins are known in the art to be of interest and able to make detectable changes.

17. Regarding claim 5.

18. Krahne teaches a semiconductor device. Said device comprises a semiconductor heterostructure which consists of a material stack of two thick undoped layers of material (paragraph 3) separated by a thin doped layer of different thin semiconductor material (fig 1e) with conductive source and drain electrodes on top of the material which are separated by a short groove (fig 1e,f) (paragraph 3).

19. Regarding claim 6.

20. Krahne teaches that the thin etched layer functions as a gate electrode (fig 1e).

21. Regarding claim 7.

22. Krahne further teaches that the bridging wire exceeds the length of the gap and is terminated (fig 1e).

23. Lieber teaches that the wires consist of molecules of a length fitting the gap between electrodes and being terminated with endgroups able to covalently bind to metal electrodes (column 15 lines 10-30).

24. It would have been obvious to one of ordinary skill in the art to have wires that consist of molecules of a length fitting the gap between electrodes and being terminated with endgroups able to covalently bind to metal electrodes in order to connect the electrodes.

25. Regarding claim 8.

26. Lieber teaches that the analate binds too the receptor changing the molecular conductance (fig 16d) (column 22 lines 5-20).
27. Regarding claim 9.
28. Krahne teaches that the heterostructure material stack comprises undoped AlGaAs for the thick layers and doped GaAs for the thin middle layer (fig 1e) (paragraph 3).
29. Regarding claim 10.
30. Krahne teaches the deposited metal is a Pd, Au alloy (paragraph 3).

Response to Arguments

31. Applicant's arguments filed 2/26/08 have been fully considered but they are not persuasive.
32. The applicant argues that the prior art does not teach that the structure is for a molecular electronics and molecular electronics biosensor applications.
33. In response to applicant's arguments, the recitation for a molecular electronics and molecular electronics biosensor applications has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

34. Further, the limitation must distinguish from the prior art in terms of structure rather than function, *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); See also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971). Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F. 2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F. 2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

35. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

36. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID GOODWIN whose telephone number is (571)272-8451. The examiner can normally be reached on Monday through Friday, 9:00am through 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke can be reached on (571)272-1657. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Steven Loke/

Supervisory Patent Examiner, Art Unit 2818